Continued to:

Pulpotomy Technique for Primary Teeth

You should keep in your mind the followings:

Although the formocresol pulpotomy technique has been recommended for many years as the principal method for treating primary teeth with carious exposures, a substantial shift away from use of this medicament has occurred because of concerns about its toxic effects. Many alternatives, including MTA, sodium hypochlorite, ferric sulfate, electrosurgery, and lasers, have been investigated to replace formocresol as the medicament of choice for pulpotomy. Despite this, formocresol continues to be a very commonly used pulpotomy medicament.

Buckley’s original formula for formocresol calls for equal parts of formaldehyde and cresol. The 1:5 concentration of this formula is prepared by, first, thoroughly mixing three parts of glycerin with one part of distilled water, and then adding four parts of this diluent to one part of Buckley’s formocresol, followed again by thorough mixing.

Ca (OH)₂ in primary teeth induce osteoclastic activity.

What do you know about Pulpotec?

Pulpotec – is a radiopaque, non-resorbable dental paste for simple, rapid and long-term treatment by pulpotomy of vital molars, both permanent and deciduous. AZ

The addition of pharmacological constituents ensures an aseptic treatment, induces cicatrization of the pulpal stump at the chamber-canal interface, whilst maintaining the structure of the underlying pulp.

The treatment of pulpitis with Pulpotec is considerably faster than by pulpectomy. It also avoids the numerous failures that have been noted with so-called «total» pulpectomy (over 50% worldwide in 1995).

Composition

- **Powder** Iodoform, Polyoxymethylene, excipient
- **Liquid** Phenol, Guaiacol, Formaldehyde, Dexamethasone Acetate, excipient

Baghdad College of dentistry
6/3/2018
Indications
Adults treatment of pulpitis on permanent vital molars. This actually includes the pre-treatment of molars prior to making abutments for a fixed prosthesis (either individual or bridge).

Pedodontics
- Treatment of pulpitis on immature permanent vital molars, enabling a complete radicular restoration of the tooth.
- Treatment of pulpitis in temporary vital molars.
- Treatment of infected deciduous molars by pulpotomy even in the presence of an abscess. This indication is the only exception to the rule of pulpotomy on vital teeth, and must be treated by regular pulpotomy, without going beyond the floor of the pulp chamber in order never to be introduced in the radicular canal of deciduous teeth. The numerous indications for using Pulpotec in pedodontics, clearly indicate its usefulness in this field.

Directions for use
Perform pulpotomy in the usual way. Pulpotec being antiseptic, the use of a rubber dam is optional. Use high-speed rotary instruments in order to avoid tearing of the radicular endings and take care to eliminate all the cameral pulp. The use of it after a pulpotomy performed with laser is also recommended.

Two methods are recommended for inserting PULPOTEC into the pulp chamber:

1. **The traditional method** Mix Pulpotec liquid with Pulpotec powder and blend to obtain required thick, creamy consistency of the paste. Insert the paste into the pulp-chamber with a large sized paste filler. The presence of small quantities of blood does not affect the efficiency of Pulpotec. Air-dry the cavity just prior to applying the paste. Seal with a temporary cement. Place a cotton roll between the 2 dental arches and request the patient to bite progressively but firmly, so that the Pulpotec paste clings to the walls of the pulp-cavity as well as to the root canal orifices.

2. **Another efficient but simple method** for inserting Pulpotec into the pulp-chamber mix the powder and the liquid on a glass slab and blend until the mix reaches the consistency of a small, supple ball of putty. Shape the ball into a cylinder and insert directly into the pulp-chamber. Press into place with a spatula and continue as indicated above with the temporary cement and the cotton roll.

**Setting time of Pulpotec is approximately 7 hours.**
Signs of pulpotomy failure:
1) Pain [we do not want pain].
2) Abscess formation.
3) Increased mobility [the tooth will exfoliate sooner than you expect] it’s not a definite sign of failure, after this early exfoliation of the tooth take an X-ray if the permanent tooth is close leave it, if still need time to erupt use a space maintainer. May be if combined with other signs, it would be definitive failure.
4) Fistula.
5) Radiographic interradicular resorption (must be compared with previous (diagnostic) radiographs).
6) Internal or external resorption.

APEXOGENESIS
It is defined as the treatment of a vital pulp in the permanent teeth by capping or pulpotomy in order to permit continued growth of the root and closure of the open apex.

It is a histological term used to describe continued physiologic development and formation of the roots apex.

Objectives
Maintenance of integrity of the radicular pulp tissue to allow for continued root growth and that is by:
1) Sustain a viable hertwige sheath to allow continued development of root length for a more favorable crown root ratio.
2) Maintaining pulpal vitality to all the remaining odontoblasts to form dentine and produce a thicker root to resist fracture.
3) Promoting root end closure for a more natural root canal structure. So that there will be decreasing in the chance of root fracture.
4) In addition, generate a dentinal bridge at the site of pulpotomy.

Therefore, there are long-term benefits from this treatment outcome on the tooth root formation.

Indications
Indicated for traumatized or pulpally involved vital permanent tooth with incomplete formation of the root apex.
Contraindications

- Evidence that radicular pulp has undergone degenerative changes
- Purulent drainage
- History of prolonged pain
- Necrotic debris in canal
- Periapical radiolucency.

NONVITAL PULP TREATMENT WITH IRREVERSIBLE PULPITIS OR NECROTIC PULP

PULPECTOMY

Primary teeth: -

It involves the removal of the entire pulp and subsequent filling of the canals of the primary teeth with a suitable resorbable material.

It is unwise to maintain untreated infected primary teeth in the mouth. They may be opened for drainage and often remain asymptomatic for an indefinite period. However, they are a source of infection and should be treated or removed. The morphology of the root canals in primary teeth makes the endodontic treatment difficult and often impractical. Mature first primary molar canals are often so small that they are inaccessible even to the smallest barbed broach. If the canal cannot be properly cleansed, of necrotic material and sterilized to be adequately filled, the endodontic therapy is more likely to fail.

Objectives of Pulpectomy

- Maintain the tooth free of infection
- Biomechanically cleanse and obturate the root canals
Promote physiologic root resorption

Hold the space for the erupting permanent tooth.

**Indications of Pulpectomy**
✓ Patient should be in good general health with no serious disease.
✓ Maximum cooperation of patient and parents.
✓ A tooth previously planned for a pulpotomy that shows uncontrolled pulpal hemorrhage.
✓ Indicated for any primary tooth in absence of its permanent successor.
✓ Any deciduous tooth with severe pulpal necrosis provided there is no radiographic contraindication.
✓ Primary teeth with necrotic pulps and minimum of root resorption.
✓ Pulpless primary teeth with stomas.
✓ Pulpless primary teeth in hemophiliacs.
✓ Pulpless primary anterior teeth when speech, esthetics are a factor.
✓ Pulpless primary molars holding orthodontic appliance.

**Note:**
In addition to the previous indications, the tooth should have adequate periodontal and bony support.

**Contraindications of Pulpectomy**

**General Contraindications**
✖ Young patient with systemic illness such as congenital ischemic heart disease, leukemia.
✖ Children on long-term corticosteroids therapy.

**Clinical Contraindications**
✖ Excessive tooth mobility.
✖ Communication between the roof of the pulp chamber, and the region of furcation.
✖ Insufficient tooth structure to allow
Radiographic Contraindications

- External root resorption.
- Internal root resorption in the apical third of the root.
- Radicular cyst, dentigerous/follicular cyst in association with the primary tooth.
- Inter-radicular radiolucency that communicates with the gingival sulcus.

Partial Pulpectomy

This procedure is indicated in primary teeth when:

1) Coronal pulp tissue and the tissue entering the pulp canals are vital but show clinical evidence of hyperemia.
2) The tooth may or may not have a history of painful pulpits, but the contents of the root canals should be show evidence of necrosis (suppuration).
3) There is no radiographic evidence of a thickened periodontal ligament or of radicular disease.

If any of these conditions are not present, a complete pulpectomy or an extraction should be performed.

The clinical procedure

The partial pulpectomy technique may be completed in one appointment that involves the removal of the coronal pulp as for the pulpotomy technique. Removal of the pulp filaments from the root canals done with a fine barbed broach; there will be considerable hemorrhage at this point. A Hedstrom file will be helpful in the removal of remnants of the pulp tissue. The file removes tissue only as it is withdrawn and penetrates readily with a minimum of resistance.

Care should be taken to avoid penetrating the apex of the tooth. After removal of the pulp tissue from the canals, a syringe is used to irrigate them with 3% hydrogen peroxide followed by sodium hypochlorite. Then dryness of the canals should done with sterile paper points. Hemorrhage should control and the canals should be dry.

Thin mix of zinc oxide-eugenol paste may be prepared, and paper points covered with the material can be used to coat the root canal walls. Small files may be used to file the paste into the walls. The excess thin paste may be removed with paper points and Hedstrom files.

Note:

Zinc oxide–eugenol paste has been viewed as the traditional root canal filling material for primary teeth.
Results from multiple studies suggest that KRI paste may be preferable. The primary components of KRI paste are zinc oxide and iodoform. The main advantages of KRI paste over zinc oxide–eugenol paste are that KRI paste resorbs in synchrony with primary roots and is less irritating to surrounding tissues if a root is inadvertently overfilled.

Another popular root canal filling material for primary teeth is Vitapex. The primary components of Vitapex are calcium hydroxide and iodoform. Vitapex may be at least as effective as KRI paste.

Complete Pulpectomy

Clinical technique is similar to partial pulpectomy but not all the procedures are done on the first visit.

On the first visit, the pulp is extirpated and all the contents of the pulp chamber and debris from the occlusal third of the canals should be removed, with care taken to avoid forcing any of the infected contents through the apical foramen. Then canals are irrigated, dried and a moistened pellet of camphorated monochlorophenol (CMCP) or 1:5 concentration of Buckley's formocresol, with excess moisture blotted, should be placed in the pulp chamber. The chamber may be sealed with zinc oxide–eugenol and the tooth is temporarily restored.

On the second visit, several days later, the tooth should be isolated with a rubber dam and the treatment pellet removed. If the tooth has remained asymptomatic during the interval, the remaining contents of the canals should be removed and the canals are enlarged. If all the symptoms have subsided, the tooth is obturated and permanently restored.

Note:

- If the tooth has been painful and there is evidence of moisture in the canals after the removal of the treatment pellet, again mechanical cleaning of the canals should be done followed by irrigation then dryness and the treatment should be repeated.
- Obturation should postponed until the symptoms regresses.
- Systemic antibiotics are advised if cellulitis is present.
- The signs and symptoms at each visit will determined the number of appointments, timing and extent of instrumentation.